Broadband Wireless Router (Access Point)

User Manual

Note

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March 2002, Rev02

Safety Instructions

Installing

- Use only the type of power source indicated on the marking labels.
- Use only the power adapter supplied with the product.
- Do not overload wall outlet or extension cords as this may increase the risk of electric shock or file, If the power cord is frayed, replace it with a new one.
- Proper ventilation is necessary to prevent the product overheating. Do not block or cover the slots and openings on the device, which are intended for ventilation and proper operation. It is recommended to mount the product with a stack.
- Do not place the product near any source of heat or expose it to direct sunshine.
- Do not expose the product to moisture. Never spill any liquid on the product.
- Do not attempt to connect with any computer accessory or electronic product without instructions from qualified service personnel. This may result in risk of electronic shock or file.
- Do not place this product on an unstable stand or table.

Using

- Power off and unplug this product from the wall outlet when it is not in use or before cleaning. Pay attention to the temperature of the power adapter. The temperature might be high.
- After powering off the product, power on the product at least 15 seconds later.
- Do not block the ventilating openings of this product.
- When the product is expected to be not in use for a period of time, unplug the power cord of the product to prevent it from the damage of storm or sudden increases in rating.

Servicing

Do not attempt to disassemble or open covers of this unit yourself. Nor should you attempt to service the product yourself, which may void the user’s authority to operate it. Please call vendor under the following conditions:

- If the power cord or plug is damaged or frayed.
- If liquid has been spilled into the product.
- If the product has been exposed to rain or water.
- If the product does not operate normally when the operating instructions are followed.
- If the product has been dropped or the cabinet has been damaged.
- If the product exhibits a distinct change in performance.

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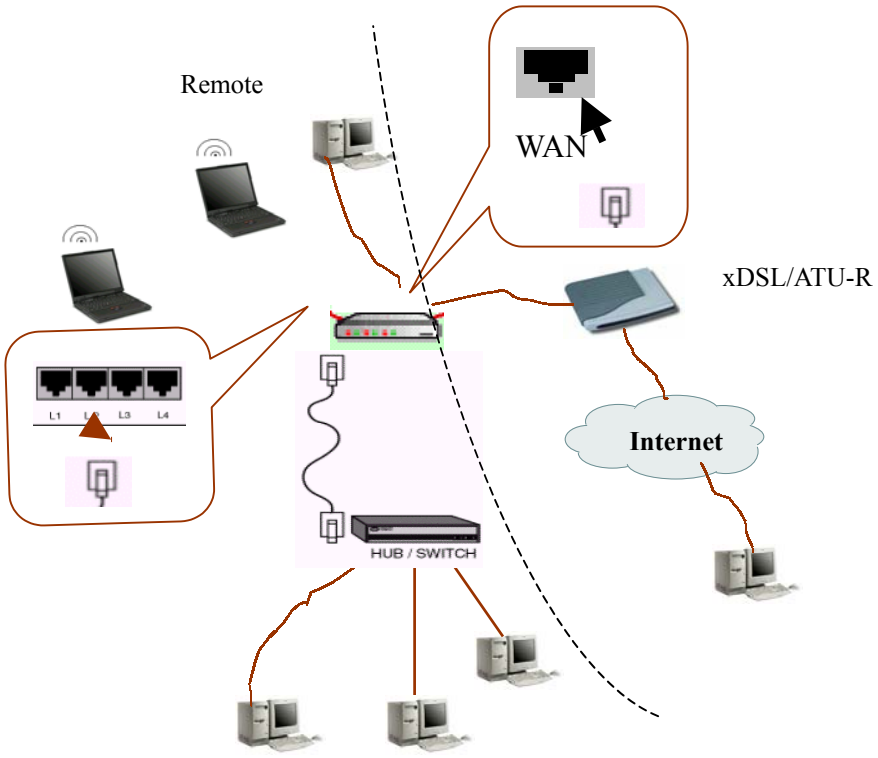
What You Can Do

Congratulations on your purchase of this Broadband Wireless Router (AP) with 4-port switch and access point that extend your existing broadband Cable/DSL connection. The 802.11b access point allows PC's with wireless cards connect together, while the high performance 4-port switch that expand your local network for small office. Also the feature-rich routing functions are seamlessly integrated to broadband service for existing home or office users. Now users can enjoy various bandwidth-consuming applications via the Broadband Wireless Router (AP) .



Connection Figure

Features

Router Feature

- Acts as Universal Plug and Play (UPnP) Internet Gateway Device (IGD) that is an implementation of the version 1 UPnP IGD standard for NAT traversal.
- NAT let multiple users on LAN to access the Internet for the cost of only one IP address and enjoy various multimedia applications.
- ALGs (Application Level Gateways): such as NetMeeting, Ftp, RealPlayer, ICQ, CuSeeMe, mIRC, Quake, Internet Games, etc.
- DMZ hosting, Multiple Virtual Servers (e.g., Web, FTP, Mail servers) can be setup in local network.
- Static Route, RIP v1, v2, IGMP Proxy
- Multiple kind of broadband WAN connection: PPPoE, DHCP Client, Fixed IP, Bridge
- DHCP Server, DNS Relay

Bridging Features

- Supports self-learning bridge specified in IEEE 802.1D Transparent Bridging
- Transparent Bridging between 4-port 10/100 Mb Ethernet switch and 802.11b Wireless LAN interface
- QoS Supports IEEE 802.1p tag for prioritize layer 2 traffic on 4-port Ethernet Switch
- Port based priority that can prioritize specific port for multimedia streaming applications
- Security Features
- PAP (RFC1334), CHAP (RFC1994) for PPPoE session
- Wireless support WEP (Wired Equivalent Privacy) uses RC4 with 40/64 and 128 bit key length
- Support IP packets filtering based on IP address, Port number, Protocol type and TCP code

Wireless LAN Features

- Fully compatible to 802.11b standard, allowing up to 11Mbps wireless rate with distance up to 300 feet / 90 meters
- The 2.4 GHz Direct Sequence Spread Spectrum (DSSS) technology is exploited.
- Seamless roaming within wireless LAN infrastructure
- Low power consumption via efficient power management
- Configuration and Management
- Configurable through Web Browser
- HTTP firmware upgrades via Web browser directly
- Support DHCP Server function for IP distribution to local network users
- QoS setting allows prioritizing one of 4 switch ports. The prioritized port could also be changed
- Event Logging, also provide different level of event display

System Requirements

For Wireless Clients

- System OS (Windows 98/2000/NT/ME/XP)
- Wireless card
- Wireless card driver

For Ethernet (wired) Clients

- System OS (Windows 98/2000/NT/ME/XP)
- 10/100Base-T NIC
- 10/100Base-T (UTP) network cable.
- Hub

Note

xDSL/ATU-R service registered from your Internet service provider (ISP) is required for Internet access.

Unpacking Your Broadband Wireless Router (AP)

Check the contents of the package against the pack contents checklist below. If any of the items is missing, please contact your ISP.

- Broadband Wireless Router (AP)
- Power Adapter
- RJ-45 Ethernet Cable
- Quick Started Guide and User Manual CD

Indicators and Connecting

Front panel

The following figure illustrates the front panel of the Broadband Wireless Router (AP):

1. When link is established, the LED is **On**.
2. When the device is transferring data, the LED is **Blinking**.

Rear Panel

The following figure illustrates the rear panel of your Broadband Wireless Router (AP).

- **PWR:** Power Switch.
- **WAN:** This RJ-45 10 Base-T port connects to an Ethernet port of xDSL/ATU-R broadband device.
- **LAN port L1/L2/L3/L4:** 10/100 Base-TX, 4 port auto-sensing & crossover Ethernet switching hub (LAN interface).
- **12VDC:** 12V power connector.
- **RST:** Factory default reset switch.

To restore factory defaults, you do not need to power off the device. Push a small, stiff object into the **RST** hole to press down the button. Keep pressing and wait fort 3 seconds (the DIAG LED will illuminate about 3 seconds and turn off) to release the button. The device will automatically restart. During restart, **do not** turn on/off the device and wait for the device to boot up.

Connecting the Broadband Wireless Router (AP)

1 Connecting to the WAN port.

Connect the Ethernet cable with your xDSL/ATU-R to the 10Base-T Ethernet WAN port on your Broadband Wireless Router (AP).

Note

1. The attached xDSL/ATU-R must provide a standard 10Base-T Ethernet connection. Please use the Ethernet cable comes with your broadband device or any other standard 10Base-T Ethernet cable.
2. The Ethernet cable supplied by your ISP for connecting to your xDSL/ATU-R may be an Ethernet crossover or a straight-through cable. It is important to use the cable provided by your ISP to connect the modem to your Broadband Wireless Router (AP).

2 Connecting to the LAN port L1/L2/L3/L4.

Attach one end of the Ethernet cable with RJ-45 connector to the LAN port of your Broadband Wireless Router (AP).

The Broadband Wireless Router (AP) incorporates a four-port switch for connection to your local Ethernet network. The Ethernet ports are capable of operation at either 10Mbps (10Base-T) or 100Mbps (100Base-Tx), depending on the Ethernet interface of the attached PC, hub or switch. For any connection which will operate at 100 Mbps, you must use a Category 5 rated cable, such as the Ethernet cable included with the Broadband Wireless Router (AP).

3 Preparing your wireless station.

You need to check the setting of wireless client stations to match the default settings of the Broadband Wireless Router (AP).

Note

1. Use **Infrastructure** as connection mode.
2. The SSID default value is **IEEE 802.11 LAN.**
3. WEP encryption is **disabled**. Authentication Type is **Open Key** (or **Open System** according to your Wireless LAN Card).

4 Connecting the power adapter.

Connect the supplied power adapter to the **12VDC** port of your Broadband Wireless Router (AP), and the other end to a power outlet.

Basic Configuration

To configure the device via web browser, at least one properly-configured PC must be connected to the LAN port (connected directly or through an external hub/switch to the LAN port of the device). The configuration can also be performed on a wireless client station (as Network 2 on Connection Figure 2).

On Ethernet Client

To access the Broadband Wireless Router (AP) via the **Ethernet** interface, the host computer must install TCP/IP protocol:

Step 1 Choose a client PC and configure it to get a dynamic IP from the Broadband Wireless Router (AP).

Step 2 Start up your browser and type 192.168.0.1 as the address to enter the web-based manager.

Step 3 Enter the default username and password. Both values are **admin** (small letters).

Step 4 Go to **Basic** > **WAN Setting** to finish basic configuration. From the drop-down list select your WAN connection type. Available options include: **Bridge**, Obtain an IP address automatically, **PPPoE** and **Specify an IP address**.
According to the type you selected, different parameters will appear. After you finish setting all the parameters, click **Apply**.

Note: You should contact your ISP for the correct connection type and its corresponding configuration information.

Step 5 Perform the task of **Save** and **Reset** to have new settings take effect. When the connection is established, the client PCs can access the Internet or remote network through the Broadband Wireless Router (AP).

On Wireless Client

Step 1 Install the wireless card driver and verify the wireless setting is as below:

1. The default SSID: **IEEE 802.11 LAN**
2. WEP encryption is **disabled**. Authentication Type is **Open Key** (or **Open System** according to your Wireless LAN Card).
3. Use **Infrastructure** connection mode.

Step 2 Check that the TCP/IP protocol is installed on your wireless client PC. Configure it to get a dynamic IP from the Broadband Wireless Router (AP).

Step 3 Enter the default username and password. Both values are **admin** (small letters).

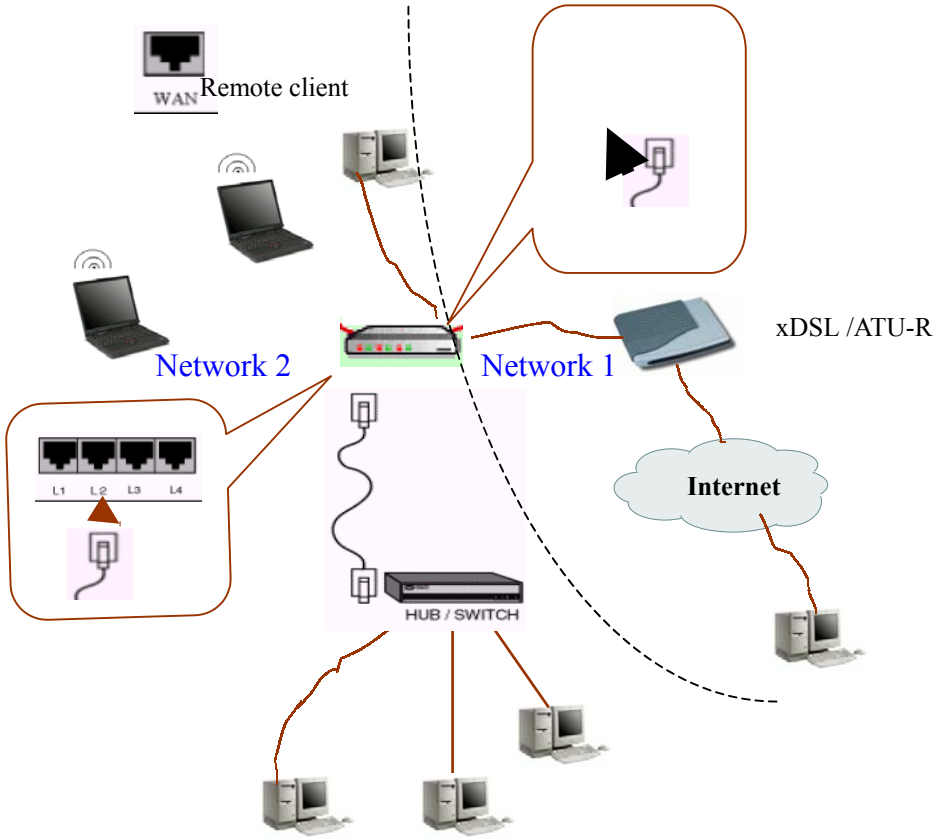
Step 4 Go to **Basic** > **WAN Setting** to finish basic configuration. From the drop-down list select your WAN connection type. Available options include: **Bridge**, **Obtain an IP address automatically**, **PPPoE** and **Specify an IP address**.
According to the type you selected, different parameters will appear. After you finish setting all the parameters, click **Apply**.

Note: You should contact your ISP for the correct connection type and its corresponding configuration information.

Step 5 Perform the task of **Save** and **Reset** to have new settings take effect. When the connection is established, the client PCs can access the Internet or remote network through the Broadband Wireless Router (AP).

Note

For the wireless-interfaced station, you need to set its SSID to the Broadband Wireless Router (AP)'s default SSID value and disable the WEP encryption.



Connection Figure 2

xDSL/ATU-R Connection

The Broadband Wireless Router (AP) provides continuous and high-speed access between your wireless and Ethernet devices. In addition, it can connect your entire network to the Internet through an external broadband access device (such as DSL modem or ATU-R shown as Network 1 in the figure below).

Note

1. The attached xDSL/ATU-R must provide a standard 10Base-T Ethernet connection. Please use the Ethernet cable comes with your broadband device or any other standard 10Base-T Ethernet cable.
2. The Ethernet cable supplied by your ISP for connecting to your xDSL/ATU-R may be an Ethernet crossover cable or a straight-through cable. It is important to use the cable provided by your ISP to connect the modem to your Broadband Wireless Router (AP).

Connecting to Your xDSL Modem

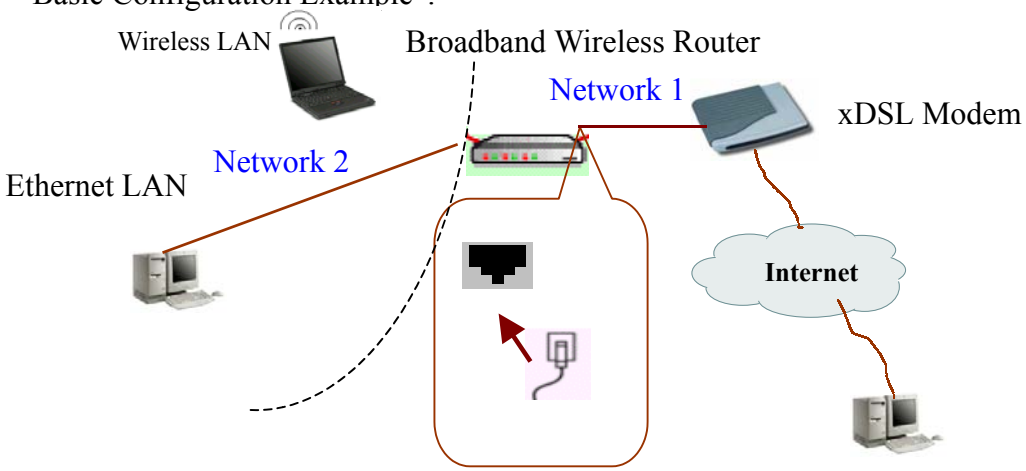
If you are going to connect the WAN port to a DSL modem, follow the steps below:

HOW to setup:

1. Use the Ethernet cable comes with your DSL modem. Plug one end to the 10Base-T Ethernet port of the modem, and the other end to the WAN port on your Broadband Wireless Router (AP) (shown as Network 1 in the figure below).
2. Attach one end of the Ethernet cable with RJ-45 connector to the LAN port of your Broadband Wireless Router (AP), and the other end to a hub or a client PC (shown as Network 2 in the figure below).
3. At the LAN side, you also can use wireless client at the same time (please refer to “Basic Configuration ” section).
4. Set the DSL Modem’s connection mode as bridge mode.
5. Enter the web-based Configuration Manager to configure the WAN setting. Choose the connection type that you registered from your ISP (refer to “WAN Setting” section).

Note

LAN configuration-purpose shown as Network 2 in the figure below, please refer to “Basic Configuration Example”.



Connecting to Your ATU-R

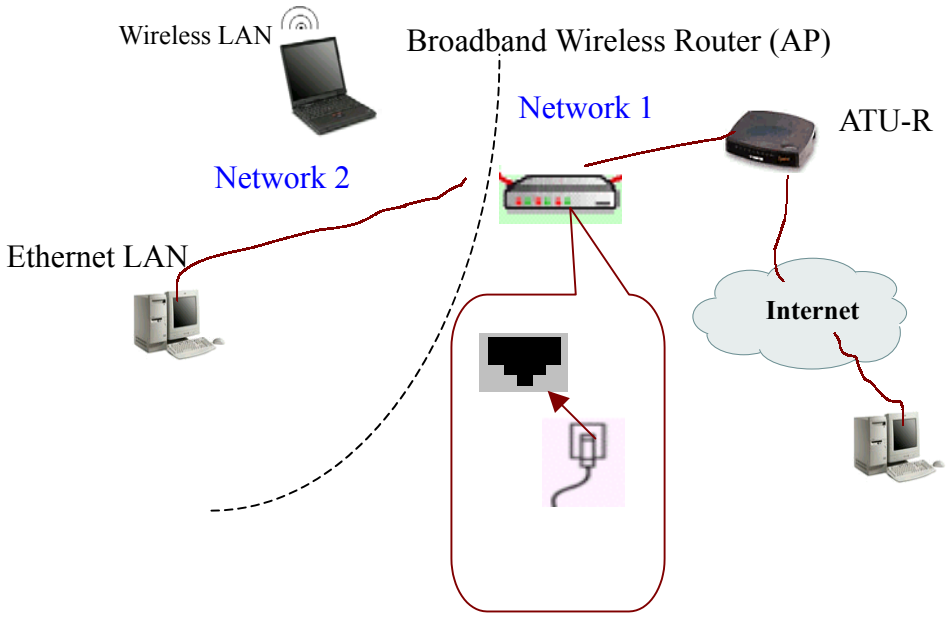
If you are going to connect the WAN port to a ATU-R, follow the steps below:

HOW to setup:

1. Use the Ethernet cable comes with your ATU-R. Plug one end to the 10Base-T Ethernet port of the modem, and the other end to the WAN port on your Broadband Wireless Router (AP) (shown as Network 1 in the figure below).
2. Attach one end of the Ethernet cable with RJ-45 connector to the LAN port of your Broadband Wireless Router (AP), and the other end to a hub or a client PC (shown as Network 2 in the figure below).
3. At the LAN side, you also can use wireless client at the same time (please refer to “Basic Configuration” section).
4. Set the ATU-R’s connection mode as bridge mode.
5. Enter the web-based Configuration Manager to configure the WAN setting. Choose the connection type that you registered from your ISP (refer to “WAN Setting” section).

Note

To connect a configuration-purpose PC shown as Network 2 in the figure below, please refer to “Basic Configuration”.



TCP/IP Configuration

By default, the Broadband Wireless Router (AP) operates as a DHCP server for the client PCs on the LAN. In order to access the Internet through the router, each host on your network must have TCP/IP installed and set up to obtain dynamic IP addresses. The following describes the procedures for client PCs to get IP addresses:

For Windows 98

Step 1 Click on the **Start** menu, point to **Settings** and click on **Control Panel**.

Step 2 Double-click the **Network** icon.

Step 3 The **Network** window appears. On the **Configuration** tab, check out the list of installed network components.

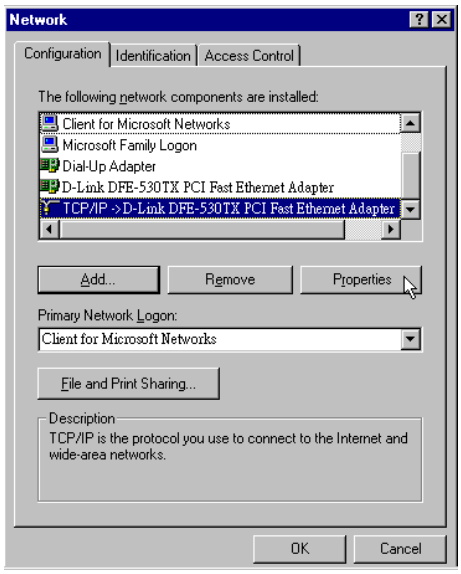
Option 1: If you have **no** TCP/IP protocol, click **Add**.

Option 2: If you have TCP/IP protocol, go to Step 6.

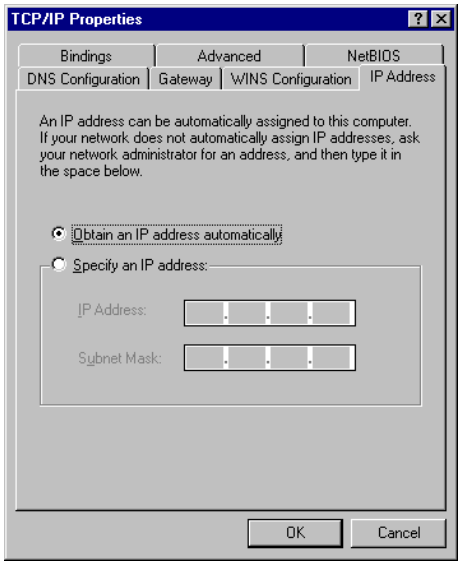
Step 4 Highlight **Protocol** and click **Add**.

Step 5 On the left side of the windows, highlight **Microsoft** and then select **TCP/IP** on the right side. Then click **OK**.

Step 6 When returning to **Network** window, highlight **TCP/IP** protocol for your NIC and click **Properties**.



Step 7 On the **IP Address** tab, select **Obtain an IP address automatically**. Then click **OK**.


TCP/IP Properties
Bindings
Advanced
NetBIOS
DNS Configuration
Gateway
WINS Configuration
IP Address
An IP address can be automatically assigned to this computer. If your network does not automatically assign IP addresses, ask your network administrator for an address, and then type it in the space below.
Obtain an IP address automatically
Specify an IP address:
IP Address:
Subnet Mask:
OK
Cancel

Step 8 When returning to **Network** window, click **OK**.

Step 9 Wait for Windows copying files.

Step 10 When prompted with **System Settings Change** dialog box, click **Yes** to restart your computer.

For Windows NT 4.0

Step 1 Click **Start**, point to **Settings**, and then click **Control Panel**.

Step 2 Double-click the **Network** icon.

Step 3 The **Network** window appears. On the **Protocols** tab, check out the list of installed network components.

Option 1: If you have **no** TCP/IP Protocol, click **Add**.

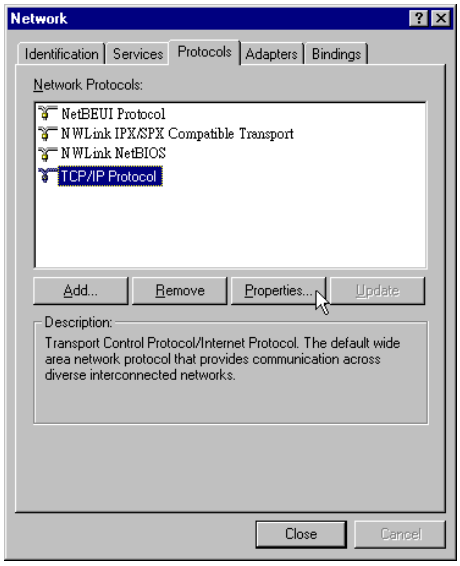
Option 2: If you have TCP/IP Protocol installed, go to Step 7.

Step 4 Highlight **TCP/IP Protocol** and click **OK**.

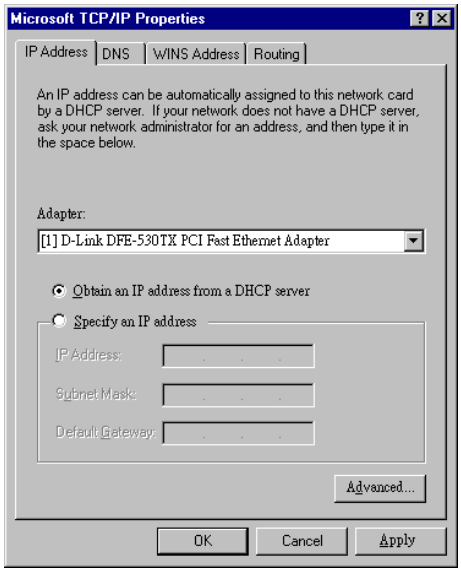
Step 5 Click **Yes** to use DHCP.

Step 6 Insert the Windows NT CD into your CD-ROM drive and type the location of the CD. Then click **Continue**.

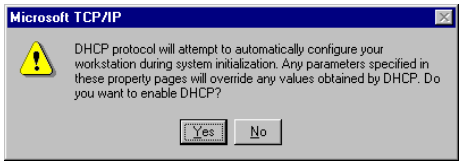
Step 7 Returning to the **Network** window, you will find the **TCP/IP Protocol** among the list. Select **TCP/IP Protocol** and click **Properties**.



Step 8 On the **IP Address** tab, click on the drop-down arrow of **Adapter** to select required adapter. Enable **Obtain an IP address from a DHCP server** and then click **OK**.


Microsoft TCP/IP Properties
IP Address
DNS
WINS Address
Routing
An IP address can be automatically assigned to this network card by a DHCP server. If your network does not have a DHCP server, ask your network administrator for an address, and then type it in the space below.
Adapter:
[1] D-Link DFE-530TX PCI Fast Ethernet Adapter
Obtain an IP address from a DHCP server
Specify an IP address
IP Address:
Subnet Mask:
Default Gateway:
Advanced...
OK
Cancel
Apply

Step 9 When prompted with the message below, click **Yes** to continue.


Microsoft TCP/IP
DHCP protocol will attempt to automatically configure your workstation during system initialization. Any parameters specified in these property pages will override any values obtained by DHCP. Do you want to enable DHCP?
Yes
No

Step 10 When returning to **Network** window, click **Close**.

Step 11 When prompted with **Network Settings Change** dialog box, click **Yes** to restart your computer.

For Windows 2000

Step 1 From the **Start** menu, point to **Settings** and then click **Network and Dial-up Connections**.

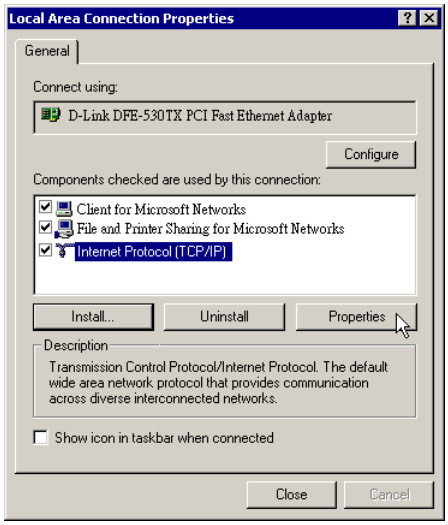
Step 2 Right-click the **Local Area Connection** icon and then click **Properties**.

Step 3 On the **General** tab, check out the list of installed network components.
Option 1: If you have **no** TCP/IP Protocol, click **Install**.
Option 2: If you have TCP/IP Protocol, go to Step 6.

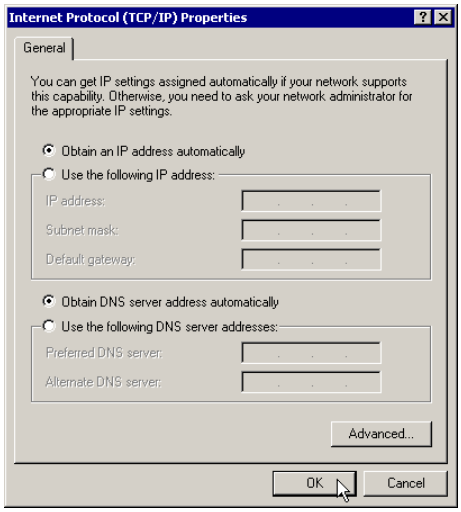
Step 4 Highlight **Protocol** and then click **Add**.

Step 5 Click **Internet Protocol(TCP/IP)** and then click **OK**.

Step 6 When returning to **Local Area Connection Properties** window, highlight **Internet Protocol (TCP/IP)** and then click **Properties**.



Step 7 Under the **General** tab, enable **Obtain an IP address automatically** and then click **OK**. When prompted to restart your computer, reboot it to enable the settings.


Internet Protocol (TCP/IP) Properties
General
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address:
Subnet mask:
Default gateway:
Obtain DNS server address automatically
Use the following DNS server addresses:
Preferred DNS server:
Alternate DNS server:
Advanced...
OK
Cancel

Renew IP Address on Client PC

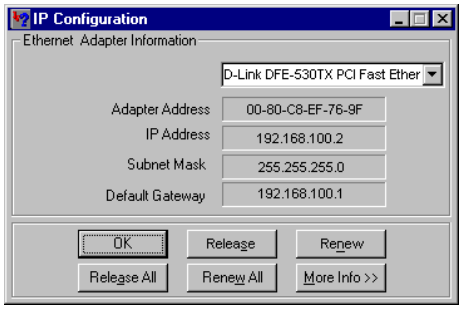
There is a chance that your PC does not renew its IP address after the Broadband Wireless Router (AP) is on line and the PC can not access the Internet. Please follow the procedures below to renew PC's IP address.

For Windows 98

Step 1 Select **Run** from the **Start** menu.

Step 2 Type **winipcfg** in the dialog box and the click **OK**.

Step 3 When the figure below appears, click **Release** and then **Renew** to get an IP address.



For Windows 2000

Step 1 From the **Start** menu, point to **Programs**, **Accessories** and then click **Command Prompt**.

Step 2 Type **ipconfig** at prompt. Then you will see the IP information from DHCP server.

Step 3 If you want to get a new IP address, type **ipconfig /release** to release the previous IP address and then type **ipconfig /renew** to get a new one.

For Windows NT4.0

Step 1 Select **Run** from the **Start** menu.

Step 2 Type **cmd** in the dialog box and the click **OK**.

Step 3 Type **ipconfig** at prompt. Then you will see the IP information from DHCP server.

Step 4 If you want to get a new IP address, type **ipconfig /release** to release the previous IP address and then type **ipconfig /renew** to get a new one.

Web Configuration Overview

Using the Web-Based Manager

Once your host PC is properly configured as described in previous chapters, please proceed as follows:

1. Start your web browser and type the private IP address of the Broadband Wireless Router (AP) in the URL field: **192.168.0.1.**
2. After connecting to the device, you will be prompted to enter username and password. By default, both values are **admin** (small letters).

If you login successfully, the main page of **BROADBAND WIRELESS ROUTER (AP)** appears. From now on the Broadband Wireless Router (AP) acts as a web server sending HTML pages/forms on your request. You can fill out these pages/forms and apply them to the Broadband Wireless Router (AP).

Outline of Web Manager

The home page of the **BROADBAND WIRELESS ROUTER (AP) - CONTROL PANEL** is composed of 3 areas:

Title: It indicates the title of this management interface.

Main Menu: It displays a list of menu organized under three headings: **Basic**, **Advanced, system**.

Basic: It displays the Basic Configuration page of the Broadband Wireless Router (AP).

Advanced: Includes advanced settings for LAN Setting, WEP, Routing, Forwarding, DMZ, UPnP and QoS.

System: Allows you to perform the management tasks and view the status and log fo the device.

Main Window: It is the current workspace of the web management, containing configuration or status information.

To Have the New Settings Take Effect

The Broadband Wireless Router (AP) uses the following mechanism to enable new settings:

1. **Apply** button.

   When **Apply** is clicked, your customizations will only be stored to the DRAM. If you do not execute **Save** & **Reset**, the customizations will not take effective next time your reboot the Broadband Wireless Router (AP).

2. **Save & Reset** button.

   When **Save** is clicked, your customizations will be saved to the flash memory. After clicking **Reset**, your customizations take effect.

Basic Configuration

WAN Setting

This page allows you to specify how the WAN port of the router connects to your ISP's server. There are four types of connection ways for you to select from. Please choose your connection mode from the drop-down list as required by your ISP. The default setting is PPPoE.

PPPoE

PPP over Ethernet is a protocol for connecting remote hosts to the Internet over an always-on connection by simulating a dial-up connection. With PPPoE the client does not set a static IP address, instead an IP address is assigned dynamically whenever the client access to the Internet. If PPPoE connection type is selected, please configure these parameters:

User ID/Password: Enter the **User ID** and **Password** provide by your ISP to access the remote host.

Connection Type:

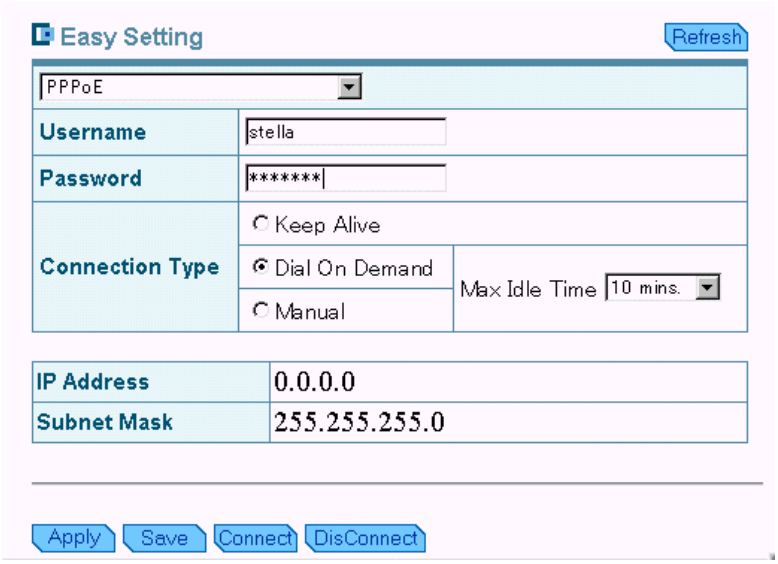
Dial On Demand: If checked, under disconnected status, if any client PC sends out request for connection, the Broadband Wireless Router (AP) will dial the ISP automatically. In this case, if the system administrator wants to disconnect the PPP session, just click the **Disconnect** button.

Keep Alive: When enabled, a PPP session will always keep on line.

Manual: This button allows you to manually launch or terminate the PPP session. For instant connection, just click the **Connect** button. The connection will be established instantly without having to restart the device or click the **Apply** button. To disconnect the PPPoE session, just click the **Disconnect** button.

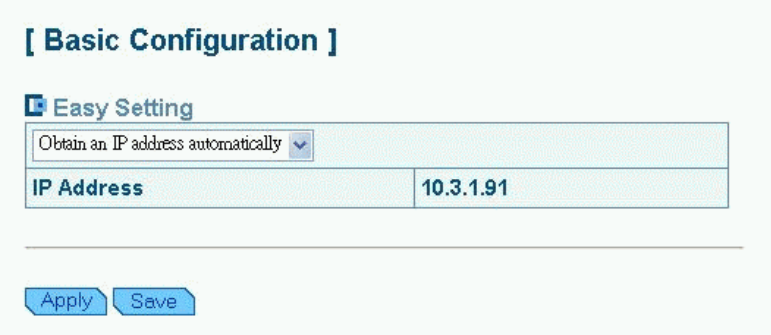
Max Idle Time: This value specifies the idle minutes that elapse before the device automatically disconnects the PPP session. If no traffic is passing through during the span of time your specified, the PPP session is terminated.

IP Address/Subnet Mask: Displays the IP address and the subnet mask the device gets after the connection is established. Clicking **Refresh** will refresh the information.



Obtain an IP address automatically

The WAN IP address and the default gateway IP address is assigned by the ISP or DHCP server of another subnet or xDSL/ATU-R. (If the modem system has DHCP server capability, the Broadband Wireless Router (AP) can act as a DHCP client and receive its WAN IP address and subnet mask from the modem.)



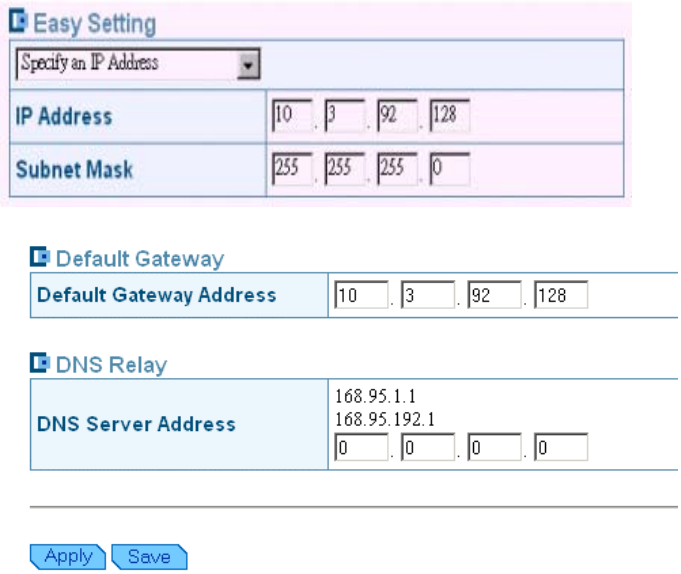
Specify an IP Address

If your ISP has assigned a fixed permanent IP address for you, choose this connection mode and configure these parameters:

IP Address/Subnet Mask: Enter the fixed IP address and its associated subnet mask provided by your ISP.

Default Gateway: This function allows you to set up the default gateway on the WAN interface of your router. Please enter the gateway IP address provided by your ISP.

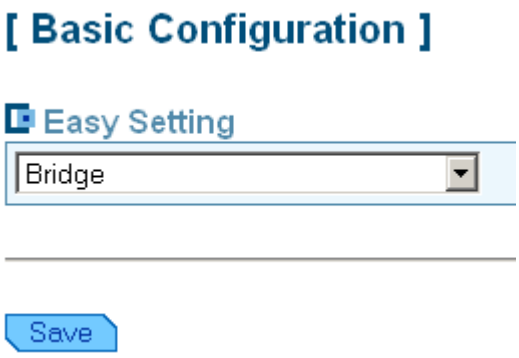
DNS Relay: Set up the IP address of the DNS (Domain Name System) server. The DNS server address will be passed to the DHCP clients along with the IP address. The DHCP clients use the DNS to map a domain name to its corresponding IP address and vice versa.



Bridge

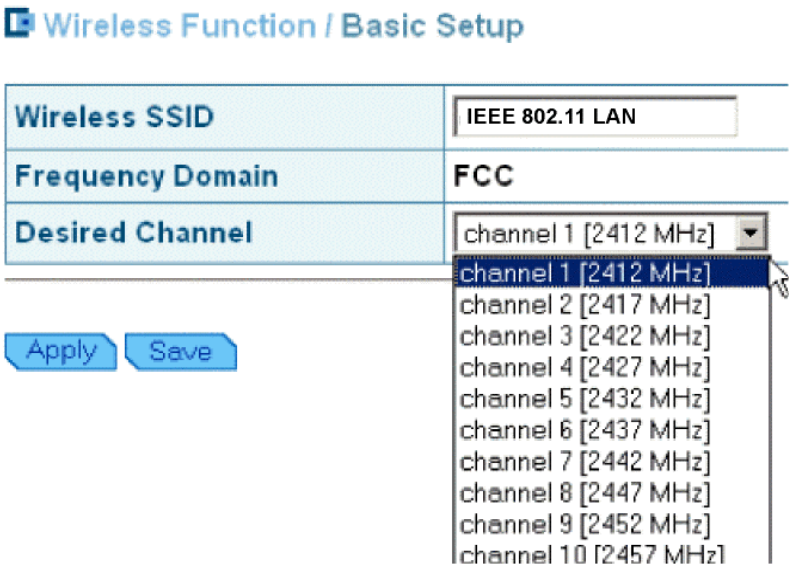
By selecting “Bridge” mode you enable bridging over the WAN port. The router can bridge the packets from your local network to the remote LAN over the WAN port.

Note
The Bridge mode is commonly used on the LAN to LAN architecture.



Wireless Setting

The Broadband Wireless Router (AP) provides wireless connectivity within a range of several hundreds feet and acts as a bridge between your wired LAN and wireless PCs. This section shows you how to configure the wireless LAN setting.



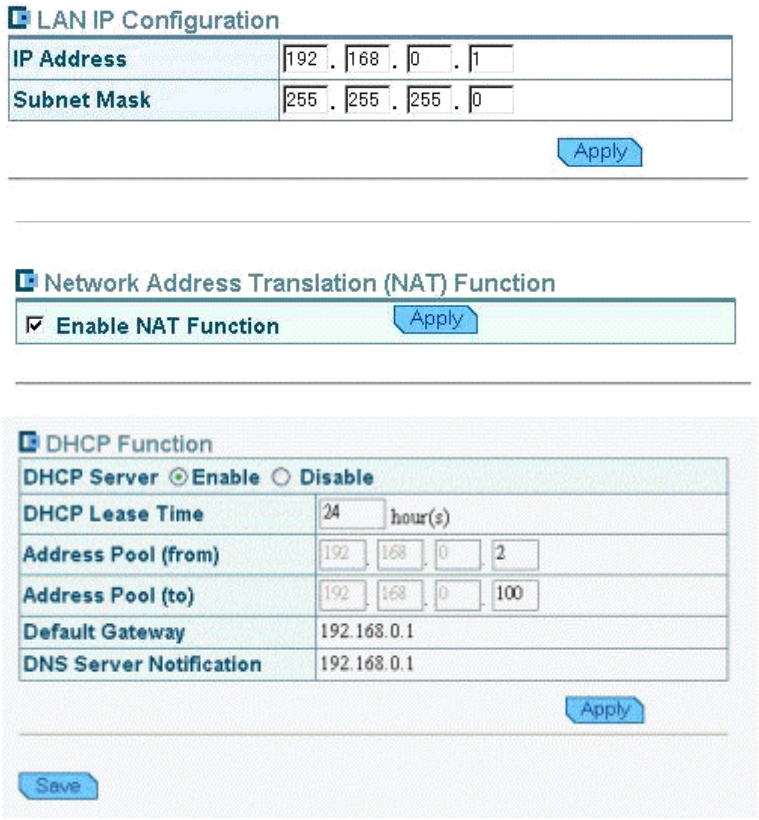
Wireless SSID (Service Set Identity): A name that uniquely identifies a wireless network. All clients that want to communicate with the Broadband Wireless Router (AP) must have the same SSID as it.

Desired Channel: The frequency in which the radio links are about to be established. Usually the clients will scan the whole operable channels and then select the desired communications channel automatically.

Advanced Configuration

LAN Setting

This page allows you to define the IP address over the LAN interface.



IP Address & Subnet Mask: Allows you to specify the private IP address on the device's LAN interface.

By default, the IP address and subnet mask is **192.168.0.1** and **255.255.255.0**. It is recommended NOT to change the default settings.

Note

If you have changed the LAN IP address, you will need to correspondingly change the IP address of the DHCP server as well as its pool address range. If you didn't do that, the DHCP client will not be able to access the router.

Enable NAT Function: Enabling NAT function allows multiple LAN machines to access the Internet for the cost of only one IP address. If you are going to enable this feature, check the box and click **Apply**.

DHCP Server: Allows you to enable or disable the DHCP function. DHCP server is enabled by default. When you instruct the router to act as a DHCP server, it assigns dynamic IP addresses to your PCs (DHCP clients) whenever they request for IP information. The DHCP server "leases" the IP addresses from a defined pool for a specified amount of time to the PCs. DHCP helps system administrators to centrally manage the assignment and distribution of IP information to PCs on the LAN.

DHCP Lease time: Specify the time that a network device can lease a private IP address before the Broadband Wireless Router (AP) reassigning the IP address.

Address Pool (from…to…): When you check the box to enable DHCP server function, you should give an available range of IP addresses (e.g. 192.168.0.2 to 192.168.0.254) that can be assigned to PCs on the LAN. PCs on the LAN will use the assigned IP addresses to access the Broadband Wireless Router (AP) through Ethernet.

Default Gateway: Use the LAN port IP address of the Broadband Wireless Router (AP) as the default gateway for PCs on the LAN.

DNS Server Notification: Let the Broadband Wireless Router (AP) relay DNS automatically.

WEP Setting

Privacy Security

The privacy security function can enhance media security by encryption technology. All clients must set the same encryption key to maintain the tightened communication with the Broadband Wireless Router (AP) properly. To turn on the privacy function:

Authentication Algorithm: Select **Open Key** or **Shared Key** as the authentication type.

Open Key
If Open Key is selected as the authentication type, a wireless station can associate to any wireless network available in the air and receive any messages that are not encrypted.

Note: Open Key is also referred as Open System in some models.

Shared Key
With shared key authentication, only those wireless stations that possess the correct WEP keys can join the wireless network.

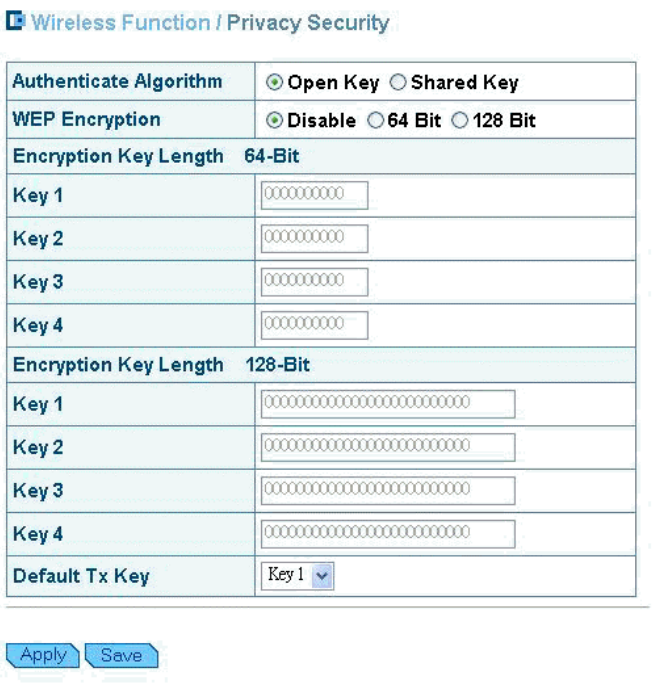
WEP Encryption

If you are not going to use WEP encryption, select the **Disable** option.

To enable WEP encryption function, select your encryption length as **64-Bit** or **128-Bit**.

When entering your WEP keys, notice that your WEP keys must be comprised of hexadecimal characters (0-9, A-F, and a-f) and must contain 10 characters for 64-bit WEP Keys or 26 characters for 128-bit WEP keys. All the four keys (Key 1-4) must be entered.

Default Tx Key: Select one WEP key from the four keys to encrypt the data you transmit.



Routing

IP Dynamic Routing

Routing Information Protocol (RIP) is utilized as a means of exchanging routing information between routers. It helps the routers to determine optimal routes. This page allows you to enable/disable this function.

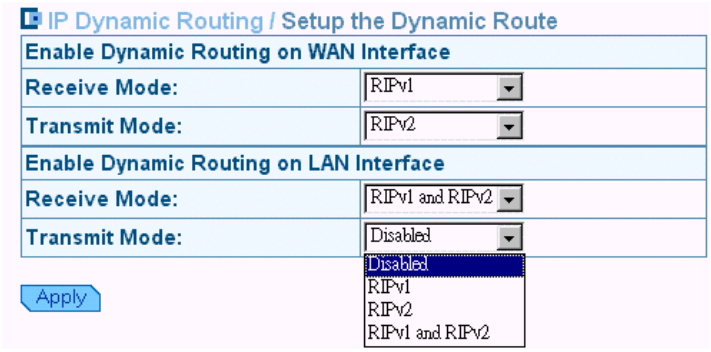
By default, RIP is disabled with Disable selected. You are allowed to enable RIP over the LAN/WAN interface. Upon each interface, you can customize the RIP on **Receive Mode** and **Transmit Mode** respectively.

Receive Mode: It incorporates the RIP information when receiving the RIP packets.

Transmit Mode: It broadcasts the routing table.

RIP Version: When enabling RIP, you can select the RIP version from **RIPv1**, **RIPv2** or both (**RIPv1 and RIPv2**).

Disable RIP: To disable RIP, just select **Disable** from the drop-down list.



IP Static Routing

This page shows all the routing rules of data packets going through your Broadband Wireless Router (AP) if it runs in routing mode. Under normal circumstances, the router has adequate routing information after it has been configured for Internet access, and your don't need to configure additional static routes. Unless your network is unusual case such as multiple routers or multiple IP subnets and you must configure static routes.

For example, if the circumstances below apply to your network:

1. You have another subnet network in your network.
2. Your another network is 10.3.1.0.
3. The IP of the two interfaces of your device are 10.3.1.1and 192.168.0.3 respectively.

Then you need to create a static route. You should enter the destination IP address 10.3.1.0 and gateway IP address 192.168.0.3 to commit the setting.

When you first configure your router, you will find a default route created with your ISP as the gateway, and the second static route was created to your local network for all 192.168.0.x addresses.

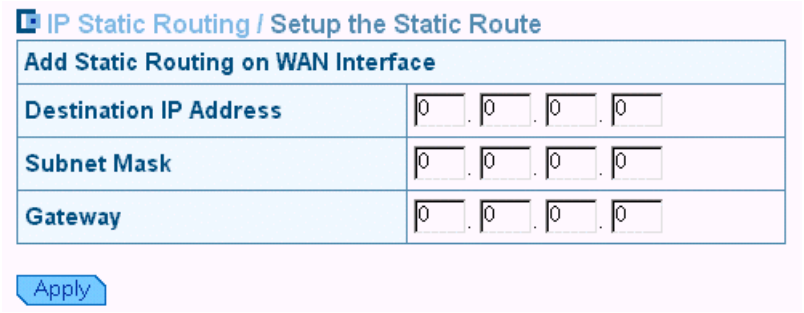
Select a Static Route: Firstly, select an existing static route or **New Entry** to edit its parameters. Click **Delete** if you want to delete it.

Network IP Address: The destination IP address of the network where data packets are to be sent.

Netmask: The subnet mask of the destination IP address.

Gateway IP address: The next IP address where data packets are to be sent for the destination you specify in previous fields. This is to be configured only when the LAN interface is configured as route; otherwise leave it as 0.0.0.0.

Delete: Allows you to select a required entry and delete it from the static route table.


IP Static Routing / Setup the Static Route
Add Static Routing on WAN Interface
Destination IP Address
0 . 0 . 0 . 0
Subnet Mask
0 . 0 . 0 . 0
Gateway
0 . 0 . 0 . 0
Apply

Forwarding

The Broadband Wireless Router (AP) implements NAT to let your entire local network appear as a single machine to the Internet. The typical situation is that you have local servers for different services and you want to make them publicly accessible. With NAT applied, it will translate the internal IP addresses of these servers to a single IP address that is unique on the Internet. NAT function not only eliminates the need for multiple public IP addresses but also provides a measure of security for your LAN.

When the router receives an incoming IP packet requesting for access to your local server, the router will recognize the service type according to the port number in this packet (e.g., port 80 indicates HTTP service and port 21 indicates FTP service). By specifying the port number, you tell the router which service should be forwarded to the local IP address you specify.

Protocol: Select a protocol type used by the service that will be forwarded.

TCP/IP Port: The Broadband Wireless Router (AP) supports port mapping function which translates a standard port number to a non-standard number. Incoming data packets sent to a specific IP port can be mapped to the port you specify. The most often used port numbers include:

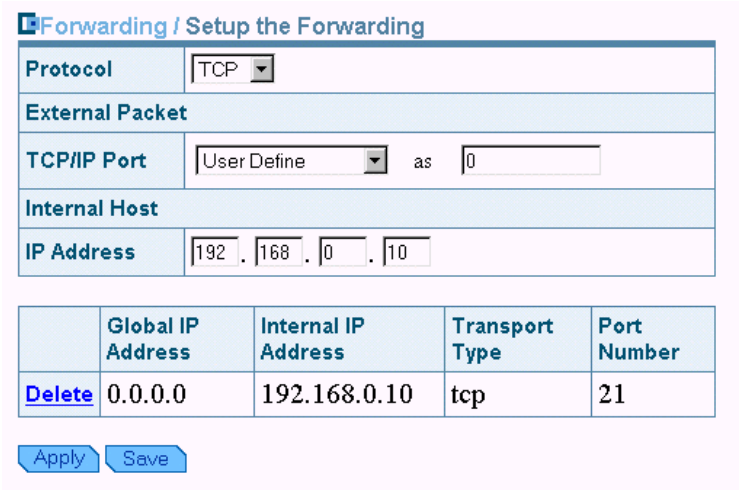
21 (FTP), 80 (HTTP), 23 (Telnet) and 25(SMTP)

IP Address: Specify the internal IP address to which the packets are forwarded to.

How to configure port forwarding:

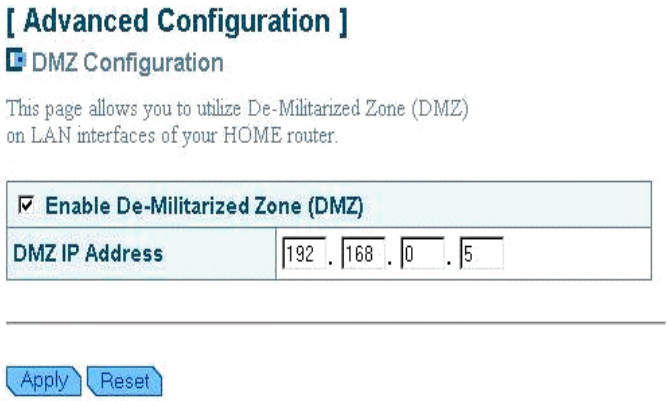
1. Select the protocol type from the drop-down list.
2. Select a service in **TCP /IP Port** field and enter the port number.
3. Enter the IP address of the local server in the **IP Address** filed.
4. Click **Apply** button to commit the setting.

If you are going to delete a forward entry, select it from the status filed to delete it.



DMZ

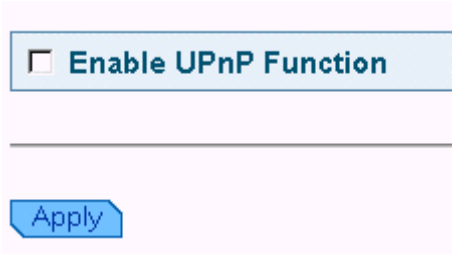
NAT separates an external network from directly referencing an internal network. With DMZ configuration, a DMZ host acts as a neutral zone between the private network and the outside network. For example, if you have a host providing online games or videoconferencing applications which are incompatible through NAT, you can specify its IP address here and then click the **Apply** button.


[Advanced Configuration]
DMZ Configuration
This page allows you to utilize De-Militarized Zone (DMZ) on LAN interfaces of your HOME router.
Enable De-Militarized Zone (DMZ)
DMZ IP Address
192 . 168 . 0 . 5
Apply
Reset

UPnP

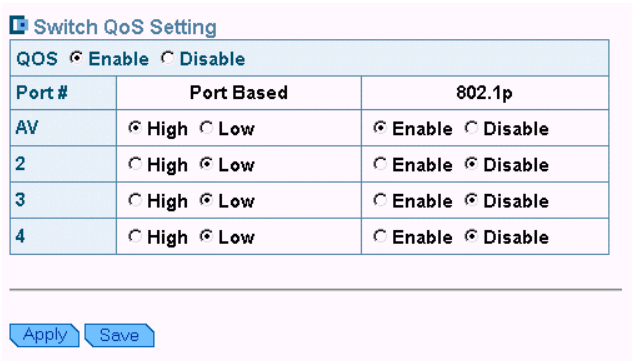
Universal plug and play (UPnP) is an architecture for pervasive peer to peer network connectivity of intelligent appliances, wireless devices and PCs of all form factors. It is designed to bring easy-to-use, flexible, standards-based connectivity to ad-hoc or unmanaged networks whether in the home, in a small business, public spaces, or attached to the Internet.

To enable UPnP function, just check the **Enable UPnP Function** box and then click **Apply** button to activate the function.



QOS

The Broadband Wireless Router (AP) comes with 4 10/100 Base-TX ports. It is capable of auto-sensing the Ethernet switching hub if a non-crossover cable is attached. In this page, you can select whether to enable or disable QOS management function. You also can set the priority for each switch port and select whether to enable or disable the 802.1p.


Switch QoS Setting
QOS Enable Disable
Port # Port Based 802.1p
AV High Low Enable Disable
2 High Low Enable Disable
3 High Low Enable Disable
4 High Low Enable Disable
Apply Save

System

Management

Security

For administration security, specify required **User Name** and **Password**. It limits this web-based manager access to users with the correct password. By default, the user name and password are **admin** (small letters).

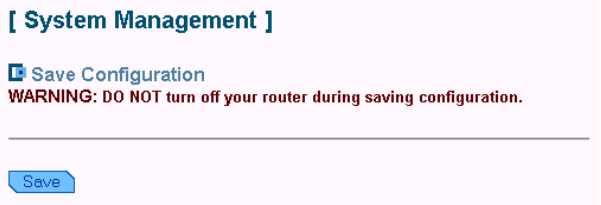
After clicking **Apply** to change the and password, the new setting takes effect currently. When you continue to access other pages, you will be prompted to re-login with new and password immediately.

To save the new settings to flash memory and take effect next time your reboot the Broadband Wireless Router (AP), after clicking **Apply** you should perform the task of **Save & Reset**.

Save

Whenever you specify or modify a parameter, your customizations will be *currently* effective after clicking **Apply**. However, you should perform the **Save** & **Reset** task to have current settings take effect.

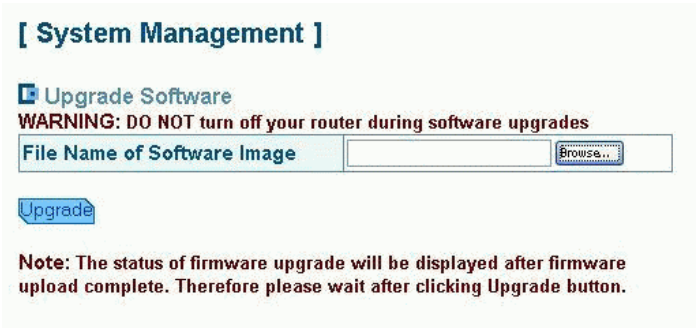
By clicking **Save**, new settings are saved to the flash memory of the Broadband Wireless Router (AP). Do not turn off the Broadband Wireless Router (AP) during saving configuration.



Upgrade

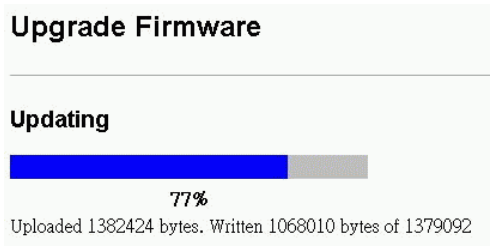
The Broadband Wireless Router (AP) supports the upgrading via HTTP protocol. The original configuration will still exist and not reset to the factory defaults. To transfer the firmware file, follow the steps below:

1. Click **Browse** to locate the software image file on your local host and then click **Upgrade**.

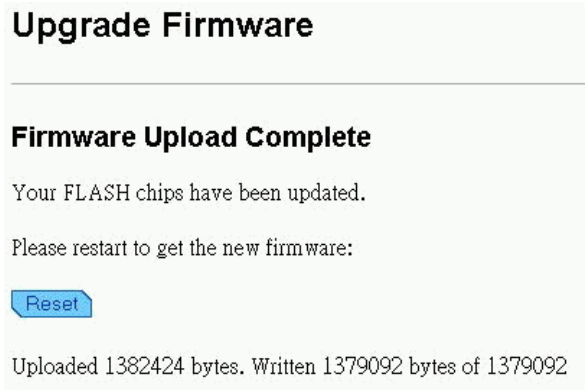

[System Management]
Upgrade Software
WARNING: DO NOT turn off your router during software upgrades
File Name of Software Image
Browse...
Upgrade
Note: The status of firmware upgrade will be displayed after firmware upload complete. Therefore please wait after clicking Upgrade button.

2. You will be warned not to turn off the device. Click **OK**.

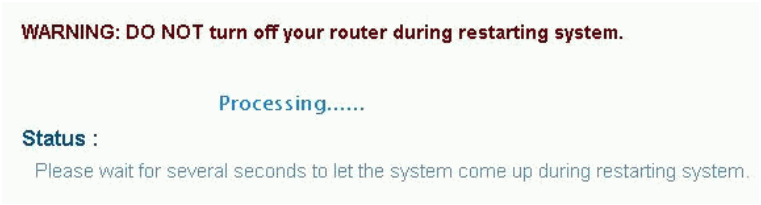
3. Wait for the system upgrading.



4. When upload is complete, you will be prompted to restart your device. Click **Reset**.


Upgrade Firmware
Firmware Upload Complete
Your FLASH chips have been updated.
Please restart to get the new firmware:
Reset
Uploaded 1382424 bytes. Written 1379092 bytes of 1379092

5. During restarting , do not turn off the device and wait for several seconds to let the system come up.


WARNING: DO NOT turn off your router during restarting system.
Processing.....
Status :
Please wait for several seconds to let the system come up during restarting system.

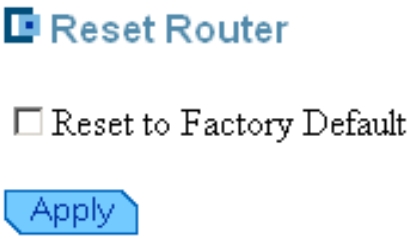
Note

Do not interrupt the upgrade process otherwise it might cause damage to your Router.

Reset

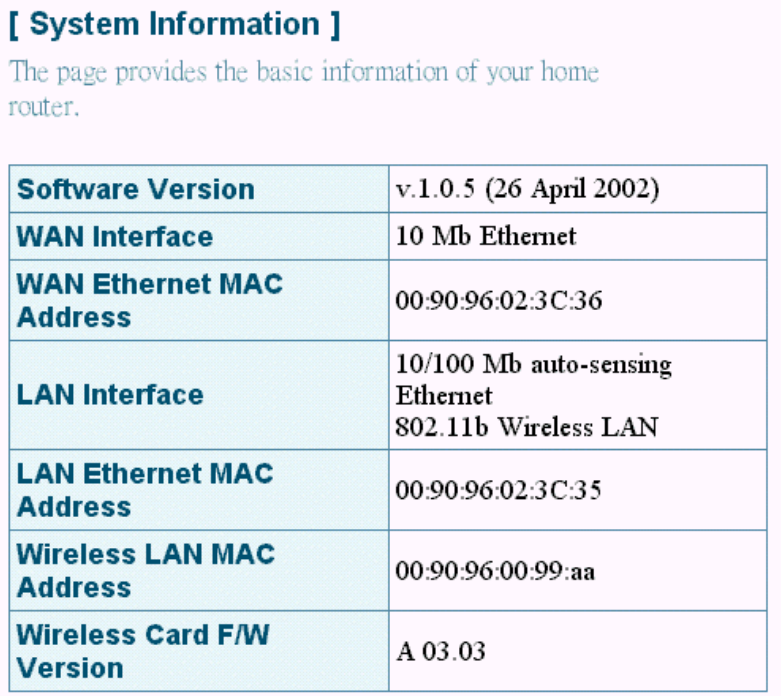
After clicking **Save**, you should click **Reset** to have new settings take effect. After restarting, you should wait for several seconds to let the system come up.

When restarting the system, your browser session will be disconnected. This may appear as if you browser is hungup. Please wait until the device finishs restarting.



Status

This page shows the basic information of your Broadband Wireless Router (AP) including the software version, WAN MAC address, LAN MAC address, Wireless LAN MAC address etc. It provides a general overview of your Broadband Wireless Router (AP).



[System Information]

The page provides the basic information of your home router.

Software Version	v.1.0.5 (26 April 2002)
WAN Interface	10 Mb Ethernet
WAN Ethernet MAC Address	00:90:96:02:3C:36
LAN Interface	10/100 Mb auto-sensing Ethernet 802.11b Wireless LAN
LAN Ethernet MAC Address	00:90:96:02:3C:35
Wireless LAN MAC Address	00:90:96:00:99:aa
Wireless Card F/W Version	A 03.03

Log

Information Log displays a running record of your router, including information, warning and error log. The information provided are useful in working with your ISP or system administrators when troubleshooting.

[System]

Information Log

This page shows all information log(include waring and error) of your Router.

Information Log

Information Log
Waring Log
Error Log

	Module	Event
2001.9.12(Wed) 10:00:00	Dhcpserver	ImDhcpserver can't open
2001.9.12(Wed) 10:02:00	Nat	ImIpInterface is not a symbol
2001.9.12(Wed) 10:02:30	firewall	disable
2001.9.12(Wed) 10:12:30	upnp	waring:not active

Glossary

This chapter presents a more detailed description of the Broadband Wireless Router (AP)'s configuration parameters.

DHCP (Dynamic Host Configuration Protocol)

When operates as a DHCP server, the Broadband Wireless Router (AP) assign IP addresses to the client PCs on the LAN. The client PCs "leases" these Private IP addresses for a user-defined amount of time. After the lease time expires, the private IP address is made available for assigning to other network devices.

The DHCP IP address can be a single, fixed public IP address, an ISP assigned public IP address, or a private IP address.

If you enable DHCP server on a private IP address, a public IP address will have to be assigned to the NAT IP address, and NAT has to be enabled so that the DHCP IP address can be translated into a public IP address. By this, the client PCs are able to access the Internet.

Authentication and WEP Encryption

The absence of a physical connection between nodes makes the wireless links vulnerable to eavesdropping and information theft. To provide a certain level of security , the IEEE 8002.11 standard has defined two types of authentication methods, open key and shared key. With open key authentication a wireless PC can join any network and receive any messages that are not encrypted. With shared key authentication, only those PCs that possess the correct authentication key can join the network. By default IEEE 802.11 wireless devices operate in an Open Key network.

LAN (Local Area Network) & WAN (Wide Area Network)

A LAN is a computer network limited to the immediate area, usually the same building or floor of a building. A WAN, on the other hand, is an outside connection to another network or the Internet.

The Ethernet side of the Broadband Wireless Router (AP) is called the LAN port. It is a twiced-pair Ethernet 10Base-T interface. A hub can be connected to the LAN port. More than one computers, such as server or printer, can be connected through this hub to the Broadband Wireless Router (AP) and composes a LAN.

The WAN port of the Broadband Wireless Router (AP) composes the WAN interface, which supports PPP or RFC 1483 connecting to another remote DSL device of ATU-R.

Private IP Address

Private IP addresses are also LAN IP addresses, but are considered "illegal" IP addresses to the Internet. They are private to an enterprise while still permitting full network layer connectivity between all hosts inside an enterprise as well as all public hosts of different enterprises.

The Broadband Wireless Router (AP) uses private IP addresses by assigning them to the LAN that cannot be directly accessed by the Internet or remote server. To access the Internet, private network should have an agent to translate the private IP address to public IP address.

RIP (Routing Information Protocol)

RIP is a routing protocol that uses the distance-vector routing algorithms to calculate least-hops routes to a destination. It is used on the Internet and is common in the NetWare environment. It exchanges routing information with other routers. It includes V1, V2 and V1&V2, which controls the sending and receiving of RIP packets over Ethernet.

Virtual Server

You can designate virtual servers, e.g., a FTP, web, telnet or mail server, on your local network and make them accessible to the outside world. A virtual server means that it is not a dedicated server -- that is, the entire computer is not dedicated to running on the public network but in the private network.

SSID

SSID is a thirty-two character(maximum) alphanumeric key identifying the wireless local area network.

Service Set Identity. A group name shared by all members of an IEEE 802.11b network. Only devices with the same SSID are allowed to establish connections. For the wireless devices in a network to communicate with each other, all device must be configured with the same SSID.

UDP (User Data gram Protocol)

UDP is a connectionless transport service that dispenses with the reliability services provided by TCP. UDP gives applications a direct interface with IP and the ability to address a particular application process running on a host via a port number without setting up a connection session.

Infrastructure mode

A backbone to extend the service provided by network. This mode provides wireless connectivity to multiple wireless network devices within a fixed range or area of coverage, interacting with wireless nodes via an antenna.

MAC Address

Media Access Code Address. A unique, 48-bit number assigned to every network interface card by the manufacturer.

NAT (Network Address Translation) IP Address

NAT is an Internet standard that translates a private IP within one network to a public IP address, either a static or dynamic one. NAT provides a type of firewall by hiding internal IP addresses. It also enables a company to use more internal IP addresses.

If the IP addresses given by your ISP are not enough for each PC on the LAN and the Broadband Wireless Router (AP), you need to use NAT. With NAT, you make up a private IP network for the LAN and assign an IP address from that network to each PC. One of some public addresses is configured and mapped to a private workstation address when accesses are made through the gateway to a public network.

For example, the Broadband Wireless Router (AP) is assigned with the public IP address of 168.111.2.1. With NAT enabled, it creates a Virtual LAN. Each PC on the Virtual LAN is assigned with a private IP address with default value of 192.168.0.2 to 192.168.2.254. These PCs are not accessible by the outside word but they can communicate with the outside world through the public IP 168.111.2.1.

Troubleshooting

Problems with LAN

On Ethernet client

1. **PCs on the LAN can not get IP addresses from the Broadband Wireless Router (AP).**
   The chances are that the interface used as DHCP server is modified and the client PCs do not renew IP addresses.

   If your DHCP server is enabled on private IP Address previously and you modify the interface to public IP Address, the client PCs should renew IP addresses.
2. **The PC on the LAN cannot access to the Broadband Wireless Router (AP).**
   Check that your PC is on the same subnet with the Broadband Wireless Router (AP).

On Wireless client

- Check your wireless LAN card driver is properly installed.
- Check the wireless configuration of the Broadband Wireless Router (AP) .

3. **Can't access the Router's Web Configuration interface from a PC on your local network.**
   - Make sure you are using the correct login information, the default login name and password are **admin** (small letters).
   - Make sure your PC's IP address is on the same subnet as the router. If you are using the recommended addressing scheme, your PC's address should be in the range of 192.168.0.2 to 192.168.0.254.

   Note

   1. If you use DHCP server and your PC's IP address is shown as 169.254.x.x: please renew the IP address and check the connection from the PC to the router.
   2. If you are using a wireless LAN card equipped PC, check that the SSID and WEP settings are the same for the router and PC.
   3. If your router's IP address has been changed and you don't know the current IP address, clear the router's configuration to factory defaults. This will set the router's IP address to 192.168.0.0

Problems with WAN

1. **If you router can't access the Internet, you should first determine whether the router is able to obtain a WAN IP address from the ISP. Or you have been assigned a static IP address.**
   - Check the IP address for the WAN port.
   - If your ISP requires a login program as PPP over Ethernet (PPPoE), ensure the user name and password you enter are correctable.

- If your Broadband Wireless Router (AP) is set to routing mode and you use private IP addresses on the LAN, make sure Network Address Translation (NAT) is enabled.
- Your PC may not recognize any DNS server address. Check your DNS setting on the Broadband Wireless Router (AP).

2. **Check the physical connection between the Broadband Wireless Router (AP) and the xDSL/ATU-R.**

   At the DOS prompt, ping the IP address of the Broadband Wireless Router (AP). That is, ping the WAN IP address that you set or provided by your ISP. If the following response occurs:

   Reply from WAN IP address(xxx..xxx.xxx.xxx) bytes=32 time=100ms TTL=253

   Then the connection between the Broadband Wireless Router (AP) and the network is OK.

   If you get a failed ping with the response of:

   Request time out

   Then the connection is fail. Check the cable between the Broadband Wireless Router (AP) and the network.

3. **Check the DNS setting of the Broadband Wireless Router (AP).**
   At the DOS prompt, ping the IP address of the DNS provided by your ISP. For example, if your DNS IP is 168.95.1.1, then ping 168.95.1.1. If the following response occurs:

   Reply from 168.65.1.1 bytes=32 time=100ms TTL=253

   Then the connection to the DNS is OK.

   If you get a failed ping with the response of:

   Request time out

   Then the DNS is not reachable. Check your DNS setting on the Broadband Wireless Router (AP).

Problems with Upgrading

The following lists the error messages that you may see during upgrading and the action to take.

1. **Error Message**: invalid file format
   Possible cause: The firmware file format is invalid.

   Action: Check the file format is correct, otherwise download a firmware file with correct format.

2. **Error Message**: firmware update in process
   Possible cause: The upgrade is already in process.

   Action: Do not turn off your Broadband Wireless Router (AP) otherwise you will cause damage to the device.

3. **Error Message**: can’t allocate update buffer
   Possible cause: It may caused by the lack of memory.

   Action: Reboot your Broadband Wireless Router (AP) and perform the upgrade task again.

Problems with Date and Time

The Broadband Wireless Router (AP) uses the Network Time Protocol (NTP) to obtain the current time from one of the Network Time Servers on the Internet. If your LCD Panel can't display the date and time, please check whether the SNTP setting is correct.

SPECIFICATIONS

Wireless LAN Features

- IEEE802.11/802.11b Compliant
- The 2.4 GHz Direct Sequence Spread Spectrum (DSSS) technology is exploited
- Operating Frequency Range
  2.4GHz (2400-2483.5MHz) ISM Band
- Support 11 / 5.5 / 2 / 1 Mbps Tx Rate (with Auto Rate Fall Back)
- Modulation Technique
  CCK for 11/5.5 Mbps Tx Rate
  DQPSK for 2 Mbps Tx Rate
  DBPSK for 1 Mbps Tx Rate
- Regulation Domain & Numbers of selectable Channels
  FCC 11 Channels (For USA & Taiwan)
  ETSI 13 Channels (For Europe)
  MKK1 14 Channels (For Japan)
- Media Access Protocol CSMA/CA with ACK for uni-cast data frame
  CSMA/CA for multi-cast/broadcast data frame
- Tx Power (Output Power) : 17dbm
- Rx Sensitivity
  11Mbps CCK : -80 dbm with FER < 8% (PSDU 1024 bytes)
  2 Mbps DQPSK : -85 dbm with FER < 8% (MPDU 1024 bytes)
- Seamless Roaming by Association/Re-association/De-association within the same IP subnet
- Number of Client Stations : more than 64
- Access Control with the same SSID & WEP setting
- WECA Wi-Fi Certification

Routing Features

- NAT let multiple users on LAN to access the Internet for the cost of only one IP address and enjoy various multimedia applications.
- ALGs (Application Level Gateways): such as NetMeeting, Ftp, RealPlayer, ICQ, CuSeeMe, mIRC, Quake, Internet Games, etc.
- DMZ hosting, Multiple Virtual Servers (e.g., Web, FTP, Mail servers) can be setup in local network.
- Static Route & Dynamic Route (RIP v1, v2)
- IGMP Proxy
- Multiple kind of broadband WAN connection: PPPoE Client, DHCP Client, Fixed IP, Bridge
- DHCP Server, DNS Relay

- TCP/IP v4
- Support VPN PPTP pass through, IPSec Pass through

Bridging Features

- Supports self-learning bridge specified in IEEE 802.1D Transparent Bridging
- Transparent Bridging between 4-port 10/100 Mb Ethernet switch and 802.11b Wireless LAN interface
- QoS Supports IEEE 802.1p tag for prioritize layer 2 traffic on 4-port Ethernet Switch
- Port based priority that can prioritize specific port for multimedia streaming applications

Security Features

- PAP (RFC1334), CHAP (RFC1994) for PPPoE session
- Wireless support WEP (Wired Equivalent Privacy) uses RC4 with 40/64 and 128 bit key length
- Support IP packets filtering based on IP address, Port number, Protocol type and TCP code field flags

Configuration and Management

- Configurable through Web Browser (Web-based management)
- TFTP firmware upgrades via Web browser directly
- Support DHCP Server function for IP distribution to local network users
- Support DHCP Client function for WAN interface to get network settings from ISP
- QoS setting allows prioritizing one of 4 switch ports. The prioritized port could also be changed
- Event Logging, also provide different level of event display
- Provide Windows drivers (including Windows 98, ME, XP, 2000) for WLAN card management

Interface Specification

- WAN Port : One IEEE802.3 Compliant 10 Base-T RJ-45 port for Broadband connection (Cable/DSL or direct Ethernet)
- LAN Port : Four IEEE802.3u Compliant 10/100Base-TX RJ-45 Switch ports with MDI auto sensing & crossover function for LAN connection
- IEEE802.11/802.11b Wireless Module with two internal antenna with diversity function

Electromagnetic Compliance

- FCC Part 15 Class B
- Safety: Dentori, IEC950
- EMI/Immunity: VCCI class B

- PTT: JATE

Power Adapter and Environmental Requirement

- AC Adaptor: Input 110±5 VAC; Output 12V DC, 1A; Frequency 60±3 Hz
- Power Consumption: less than 10 Walt
- Temperature: 5 to 40°C (operation), -10 to 55 °C (storage)
- Relative Humidity: 15% to 80% (non-condensing)

Physical

- **Front Panel**: LEDs (Power x1, Diag x1, LAN Switch x4, Wireless x1, WAN x1)
- **Back Panel**

  Power Switch RJ-45 RJ-45

  Power Jack (LAN x4) (WAN)

- **Dimensions**: 200 mm(L) x 200 mm(W) x 40 mm(H)

  Weight: 700g

  Case types: Support Stand up / Lay down